

The Effect of Nutrition and Breast Feeding on Fertility

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1. Introduction

Fertility has been defined as "Manifestation of the capability of giving birth to child". As per Davis and Black¹, fertility is related to factors: (i) affecting to the exposure to intercourse; (ii) affecting to contraception, and (iii) affecting gestation and successful parturition. Included in these are variables like age of entry into sexual unions, abstinence, fecundity or infecundity, foetal mortality, contraceptive behaviour, lactational behaviour and nutritional status of the women etc.

1.1 Malnutrition and Menarche

Frisch and Revelle² suggested that a critical body weight is required for a girl to progress through puberty, menstruation and finally develop ovulatory cycle. They postulate direct relationship between weight and menarche. They suggest that menarche is not likely to occur unless 17% of the body weight is made of fat. Fishman³ reports that body weight and composition is important and that the peripheral conversion of androgens to oestrogens in fat is important for pubertal development. A causal relationship between health and nutrition on timing of menarche and menopause have been identified. Well nourished women² have an earlier onset of menarche and later onset of menopause than poorly nourished women.

Choudhury et al⁴ 1976 has suggested that one of the factors associated with increase in age of menarche may be the deteriorating

nutritional status of children and young women in Bangladesh.

VANDERSUPY⁵ in their study, reports, "the trends towards earlier menarche in Europe which has seen over the past century (menarcheal age reduced by four months each decade) could be explained on the basis of the increase in body weight and change in composition, since European girls are better nourished today and weigh more than earlier age". The same study mentions that chronic malnutrition results in a later menarche. In Bangladesh⁴ from the report of different survey findings it was observed that age of menarche increased by about 7-8 months within a period of 10-12 years.

1.2. Malnutrition and fertility

The poor nutritional status may also be a cause of adolescent subfecundity through higher frequency of an ovulatory cycles or increase likely hood of early foetal loss and abortion. The nutritional survey 1977, shows that the average intake of caloric and other nutrient food in rural Bangladesh was less in 1975-76 compared to 1962-64.

Age specific fertility rate in table 2 shows that child bearing after marriage is delayed because of adolescent sub-fecundity of very young brides. This might be the effect of increased malnutrition in Bangladesh from 1960 to 1975.

Table 1. *Comparison of nutrients.*

	1962-64	1975-76
Caloric (kcal)	3201	2094
Protein (gm)	57.9	58.5 (most vegetable)
Fat (gm)	15.8	12.2
Carbohydrate (gm)	482.0	439.0
Calcium (mg)	273	305
Iron (mg)	10.3	22.2
Vitamin A (i u)	1070.0	730.0
Vitamin C (mg)	48.0	9.51

(Nutrition Survey Rural Bangladesh, Institute of Nutrition & Food Science, Dhaka University, 1977)

Table 2: *Age Specific Fertility Rate*

Age (yrs.)	1960-62	1966-68	1975
10-19	112	113	
15-19	335	297	168
20-24	347	314	320
25-29	348	260	316
30-34	288	208	276
35-39	180	142	219
40-44	116	46	135
45-49		5	49
Total	8.63	6.92	7.9

Source: Country Monograph Services NO. 8 Population of Bangladesh ESCAP Bangkok 1981.

The delayed maturity will lead to delayed fertility. The age specific fertility rate shown in table 11 suggests that a woman marrying at the age about 12.5 years would bear on the average about 8.6 children according to 1960-62 schedule if she remained fecund and survived upto age 50 years while if the age specific fertility of 1966-68 prevailed the women would give birth to 6.9 children.

1.3. Acute Starvation/ Malnutrition and Fertility

Different works⁵ done during famine have shown a dramatic decrease in fertility due to acute malnutrition. Majority of the women due to malnutrition and stress developed

secondary amenorrhoea and anovulation. During Second World War, the Dutch "hunger winter" the period of October, 1944 to May 1945 when average caloric intake fell to 800 calories, about 50% women became amenorrhoeic and conception rate fell below 53.3% to that of the exocerted one. A dramatic decrease in food supply, with acute weight loss, will result in decrease fecundity while chronic moderate malnutrition has little effect in population growth. Sub-optimal nutrition will result in later menarche and perhaps slight later adolescent pregnancy.

The Kung tribesman⁵ on the average starts menarche at the age of 15.5 years and the average age for first birth is 19.5 years this period of adolescent infertility has been related to inadequate body weight. the kung tribesman who are agriculturist and live mostly sedentary life have greater body weight with earlier menarche & earlier birth.

1.4 Self-imposed Dietary Restriction & Fertility

Weight related amenorrhoea and delayed menarche are commonly seen in developing countries. In western countries amenorrhoea is frequently seen in women with anorexia

nervosa, These women have extreme self imposed weight loss, distorted perception of their body image and disturbance in their attitude towards their feeling of hunger and satiety. They frequently become⁵, amenorrhoeic with the onset of weight loss and while their secondary sexual characteristics are preserved, breast atrophy and other signs of oestrogen deficiency are seen. Simple weight loss of more than 30% of body fat will cause menstrual dysfunction leading to amenorrhoea and no pregnancy.

1.5 Malnutrition and Pregnancy

The pregnancy women makes a physiologic adjustment involving herself, the foetus and the placenta. The women adjust to pregnancy and then to non-gravid state, if she is healthy. She does all those promptly and appropriately. But under certain unfavourable circumstances changes skin to depletion do occur affecting pregnancy and outcome of the pregnancy. Studies have shown that under weight women have an increased incidence of premature rupture of membranes, endo-metritis, premature infants and growth retarded infants. Pre-pregnancy weight and weight during pregnancy have the most important influence on birth weight and apgar score.

Children born out of the under weight women show inadequate rate of growth at one year and have evidence of delayed neurological development. In recent study in Bangladesh⁷ it has been observed that more than 16% of the children born are premature and their death rate is atleast 4 times higher than the matured birth. High infant mortality leads to high replacement desire and high birth rate affecting the fertility pattern.

2. Breast Feeding and Fertility

Breast feeding has a considerable impact on fertility in general and birth intervals in particular. Lactation achieves its birth spacing effect by delaying the resumption of ovulation due to delaying resumption of menstrual cycle. Suckling of infant is important for suppression of menstrual cycle. Suckling leads to release of prolactin which not only plays an important role in milk production but also inhibits the release of gonadotrophins which initiate resumption of menstruation cycle. Lactation is universal in low income countries. World Fertility survey⁶ and other surveys have shown that in most countries nursing last for 1-2 years with a tendency of rural women to nurse for more months than their sisters in urban area.

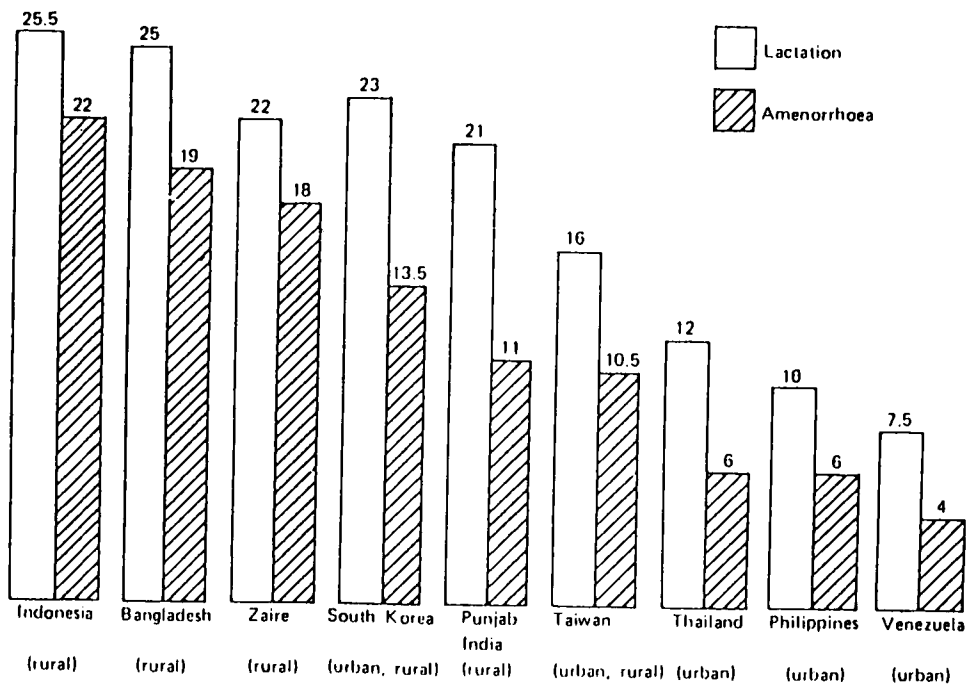
Table 3. Mean duration of lactation in selected countries

Country ⁶	Percent starting lactation	Mean duration of lactation (for women who started weaning) in months
India (Calcutta, urban)	93	16.5
India (Tamil Nadu, rural)	98	22
Indonesia (rural)	99	25.5
Sri Lanka (rural/urban)	95	18.5
Thailand (rural/urban)	86	12.0
Algeria (rural)	95	17.5
Nigeria (rural)	98	22.0

The figures from few countries are given in table 3

In survey conducted in France and Great Britain⁸ about 5 years and 10 years ago it was reported that about 50% of the women began breast feeding, of which on the average breast feeding lasted for one to two months only. The effect of lactation on resumption of menstruation is related to the type of breast feeding i. e. full breast feeding or partial breast feeding. The

women with partial breast feeding menstruate early. This also varies with age and nutritional status of the women. A study in Taiwan⁵ shows that maximum duration of amenorrhoea was about 15 months for women, nursing for 30-36 months in age group 30 and above and for women of lower age, below 30, it levelled off to about 12-13 months. The following figure will show the effect of lactation on post-partum amenorrhoea.



Mean duration of lactation and postpartum amenorrhoea (in months) among women who had weaned their infants

Mean duration of lactation and postpartum amenorrhea (in months) among women who had weaned their infants.

It is however important to know that some percentage of women become pregnant before resumption of menstruation. The report from Bangladesh, India, Philippines and USA⁸ shows that 6.68%, 7.0%, 2.5% and 2.6% of women respectively become pregnant before their resumption of menstruation after delivery. Studies have shown that women after resumption of menstruation become pregnant after 3-4 months.

Lactation has great effect in reduction of fertility in different countries. In Bangladesh⁴ birth interval averaged 36 months, of which 25 months is due to lactation. This means an effect of 42%. In Taiwan⁵ there birth interval is 30 months, the effect of lactation is 7 months and effect of lactation in prevention of pregnancy is 23%. It is estimated that in many low income countries lactation reduces fertility by 25%.

Summary

Undernutrition/malnutrition plays a very important role in reduction of fecundity and fertility and acts as natural contraception. The major effect is seen in delayed puberty and secondary amenorrhoea. Under fed women has more abortion, foetal wastage

and immature births leading to high neonatal mortality. Desire for replacement of child leads to frequent pregnancy and more malnutrition leading to more foetal wastage and maternal death which affects fertility pattern. Breast feeding has a considerable impact on fertility in general and birth intervals in particular. Lactation achieves its birth spacing effect by delaying the resumption of ovulation.

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